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TrueNAS ES102 Basic Setup Installation Guide

Contents

TrueNAS ES102 Basic Setup

Product Information

Specifications

- **Version:** 1.1
- **Model:** TrueNAS ES102
- **Type:** 4U, 102-bay expansion shelf
- **Redundant** I/O modules
- **Redundant power** supplies

Introduction

The TrueNAS ES102 is a 4U, 102-bay expansion shelf with redundant I/O modules and power supplies. It is larger than other Expansion Shelves sold by iXsystems. Please take full safety precautions when installing or servicing the enclosure.

Safety

- Static electricity can build up in your body and discharge when touching conductive materials. This Electrostatic Discharge (ESD) can be harmful to sensitive electronic devices and components.
- Before opening the system case or handling non-hot-swappable system components, please keep the following safety recommendations in mind:
- Read more about ESD and find preventative tips at **https://www.wikihow.com/Ground-Yourself-to-AvoidDestroying-a-Computer-with-Electrostatic-Discharge**

Handling the System

When handling the TrueNAS ES102, please follow these safety guidelines:

- The ES102 weighs 70 lbs unloaded and requires at least two people to lift.
- Never attempt to lift the ES102 when it is fully populated with drives as it weighs over 260 lbs. Remove all the drives before de-racking the enclosure.
- Ensure you have at least 37.5 inches (952.5mm) of space in front of a racked ES102 to fully extend the enclosure and access all drive bays.
- The high system weight can be a tipping hazard for the rack.
- Follow all tipping prevention instructions recommended by your rack provider before installing the ES102.
- Hold the system from the sides or bottom when possible to avoid damage.
- Be mindful of loose cabling or connectors and avoid pinching or bumping these elements whenever possible.

Requirements

The following items are not mandatory but can be useful when installing the ES102:

- **Support:** 855-473-7449 or 1-408-943-4100

ES102 Components

The TrueNAS ES102 is shipped with the following components:

- ES102 Expansion Shelf
- Set of rackmount rails
- Drive clips with HDDs or blanks (shipped separately)
- One Cable Management Arm (CMA) and a bag with cable ties
- Left and right cover retention brackets
- Accessory kit with two IEC C14 to C13 power cords, velcro strips, two 3-meter Mini SAS HD to Mini SAS HD cables, and racking hardware

FAQ

Q: What should I do if there is shipping damage or missing parts?

- **A:** If there is any shipping damage or missing parts, please take photos and contact iXsystems support immediately at **support@ixsystems.com,** 1-855-GREP4-iX (1-855-473-7449), or 1-408-943-4100.

Q: Where can I find the hardware serial numbers?

- **A:** The hardware serial numbers can be found on the back of each chassis for quick reference.

Introduction

- The TrueNAS ES102 is a 4U, 102-bay expansion shelf. It has redundant I/O modules and power supplies.
- The ES102 is much larger than other Expansion Shelves sold by iXsystems. Take full safety precautions when installing or servicing the enclosure.

Safety

Static Discharge

- **Warning:** Static electricity can build up in your body and discharge when touching conductive materials. Electrostatic Discharge (ESD) is harmful to sensitive electronic devices and components.
- Keep these safety recommendations in mind before opening the system case or handling non-hot-swappable system components.
- Turn off the system and remove power cables before opening the case or touching internal components.
- Place the system on a clean, hard work surface like a wooden tabletop. Using an ESD dissipative mat can also help protect the internal components.
- Touch the metal chassis with your bare hand to dissipate static electricity in your body before touching any internal components, including components not yet installed in the system. Using an anti-static wristband and grounding cable is another option.
- Store all system components in anti-static bags.
- You can find more preventative tips and details about ESD at **https://www.wikihow.com/Ground-Yourself-to-Avoid-Destroying-a-Computer-with-Electrostatic-Discharge**.

Handling the System

Warning

- The ES102 weighs 70 lbs unloaded and requires at least two people to lift.

Never attempt to lift the ES102 when it is fully populated with drives!

- The fully-populated ES102 is over 260 lbs. Remove all the drives before de-racking the enclosure.
- You need at least 37.5" (952.5mm) of space in front of a racked ES102 to fully extend the enclosure to access all drive bays.
- The high system weight can be a tipping hazard for the rack.
- Be sure to follow all tipping prevention instructions recommended by your
- rack provider before installing the ES102.
- Hold the system from the sides or bottom when possible. Always be mindful of loose cabling or connectors, and avoid pinching or bumping these elements whenever possible.
- This document uses "left" and "right" according to your perspective when facing the front of a system or rack.

Requirements

- You will need these tools to properly install the ES102 in a compatible rack:
- T25 Screwdriver
  #2 Philips head screwdriver.

**You don't need these items, but they can be useful when installing the ES102:**

- Tape measure

- Level
- Flat head screwdriver
- Cable ties.

ES102 Components

- TrueNAS units are carefully packed and shipped with trusted carriers to arrive in perfect condition.
- If there is any shipping damage or missing parts, please take photos and contact iXsystems support immediately at **support@ixsystems.com,** 1-855-GREP4-iX (1-855-473-7449), or 1-408-943-4100.
- Please locate and record the hardware serial numbers on the back of each chassis for quick reference.

Carefully unpack the shipping boxes and locate these components:
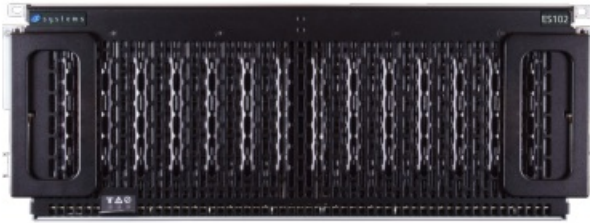
ES102 Expansion Shelf

Set of rackmount rails.

Drive clips with HDDs or blanks, shipped separately.

One Cable Management Arm (CMA) and a bag with cable ties.

Left and right cover retention brackets.

Accessory kit with two IEC C14 to C13 power cords, velcro strips, Two 3-meter Mini SAS HD to Mini SAS HD cables, and racking hardware.

Front Indicators

- Indicators on the front panel show identification and status.
- The fault indicator is on during the initial power-on self-test (POST) or when the TrueNAS software has issued an alert.
- These indicators are also on the back panel.

| Light	Color and Indication
🔦	Blinking Blue: Locate ID is active.
⚠	Blinking Amber: Fault / Alert.
✓	Green: ES102 is on.
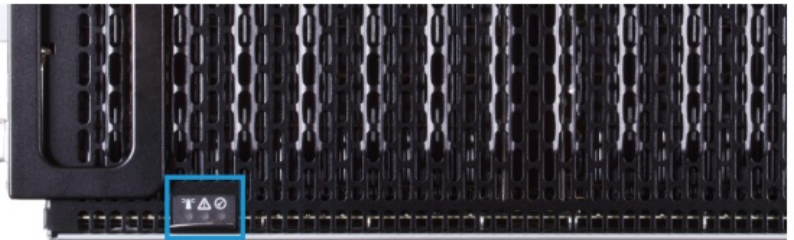
Rear Components and Ports
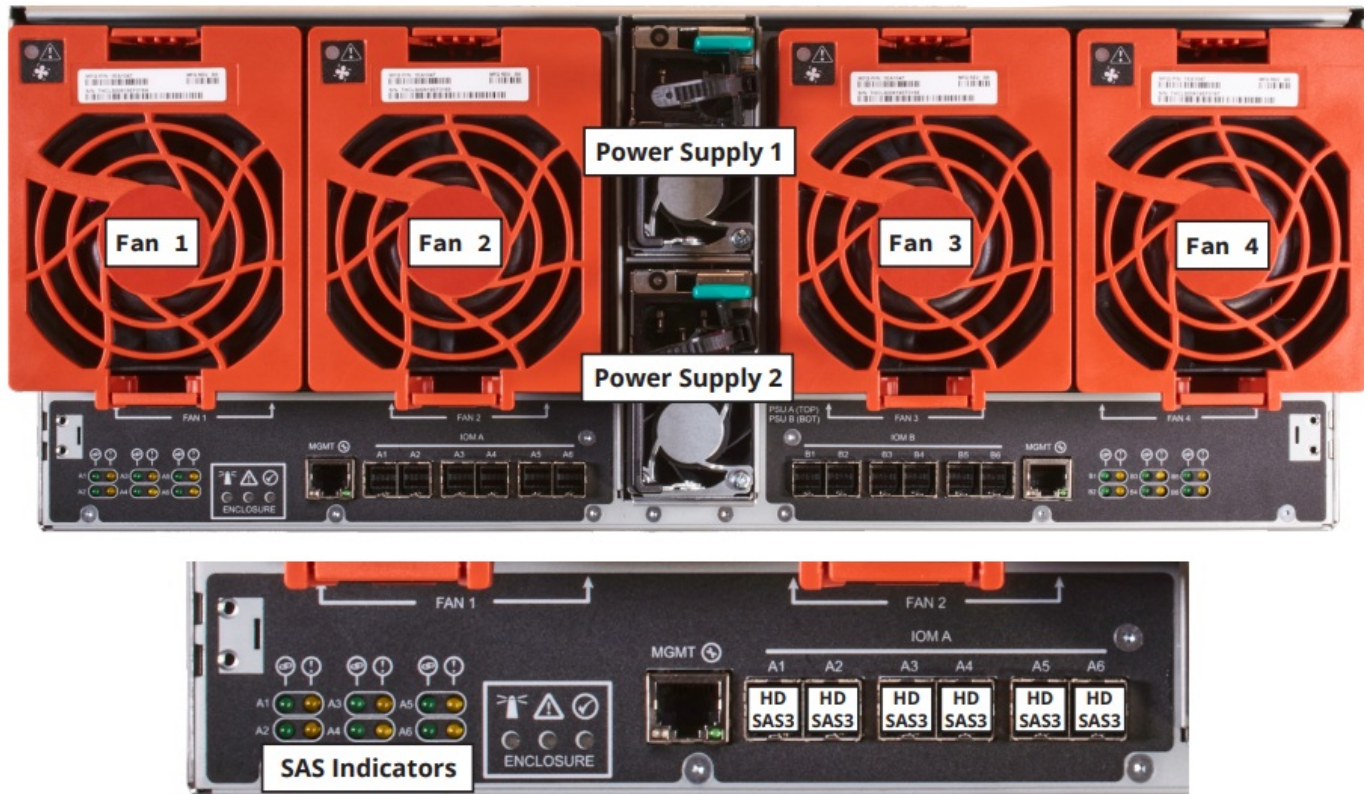
Install Railkit

- ES102 requires 4U of space in an EIA-310 compliant rack that is 47.24" (1200mm) deep, from frame to frame. The vertical rack posts must be between 31.5" – 36.2" (800mm – 920mm) apart to install the ES102 rails.
- The rack must be a standard 17.72" – 18.31" (450mm – 465mm) wide, although a minimum 29.5" (750mm) cabinet width allows for using a ZeroU PDU with the ES102. Narrower cabinets could require a rack-mounted PDU for the system to fit in the rack with the included CMA.
- The system with CMAs attached is 47.1 (1197mm) deep. Position the front vertical rack posts as close to the front as possible to prevent the cable management arms (CMAs) from protruding from the back of the rack.
- Use the bottom-most 4U space in the rack to balance the system weight with other equipment.
- We recommend the APC AR3350 rack with an AR7050A back door and the STV-4501, STV-4502, or STV-4503 PDU.
- If you are installing the ES102 in an APC AR3350 rack, go to section "12 APC AR3350 Rack Addendum".

Install Chassis Rails

- Each rack rail includes an inner chassis rail you must remove. Extend the innermost chassis rail until you expose the metal safety catch.
- Push the safety catch in and pull the chassis rail out until it is free from the rack rail. Repeat the process for the

second rail.

PRESS **PULL**
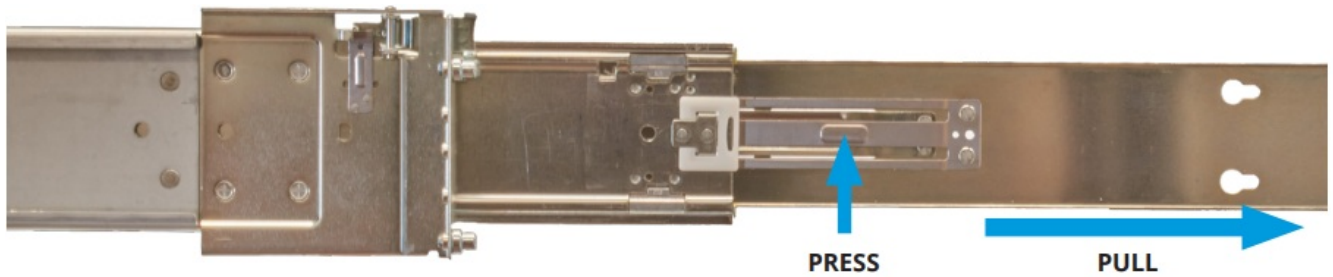
- The chassis rails attach to each side of the ES102. Align the chassis rail keyholes over the ES102 side posts. Slide the rail towards the rear of the system until the rail locks into place.
- Use three of the low-profile M4 screws to secure the rail. Repeat for on the other side. The Cable Management Arm bracket must be at the back of the system.


M4 Screw   M4 Screw   M4 Screw

Install Rack Rails

- The ES102 occupies 4U of rack space. The front rail pins mount to the 4U bottom-most attach points, and the back rail pins mount one hole above the 4U bottom-most attach points. The rails have left-side "L" and right-side "R" stamps.
- Install the front of the rail first. Align the rail pins with the mounting holes in the rack and push them through until the front latch clicks into place. Make sure an additional 2U of rack space is available above the rail.
- The rear of the rail can adjust to racks with 32" -36" of space between the front and rear rack posts.
- Align the rear rail pins with the rack mounting holes and push forward until the blue release catch clicks into place over the rack. Note that the rear rail pins install one mounting hole higher than the front rail pins.
- You can use a level to ensure the front and back of the rail are even.

Front **Rear**
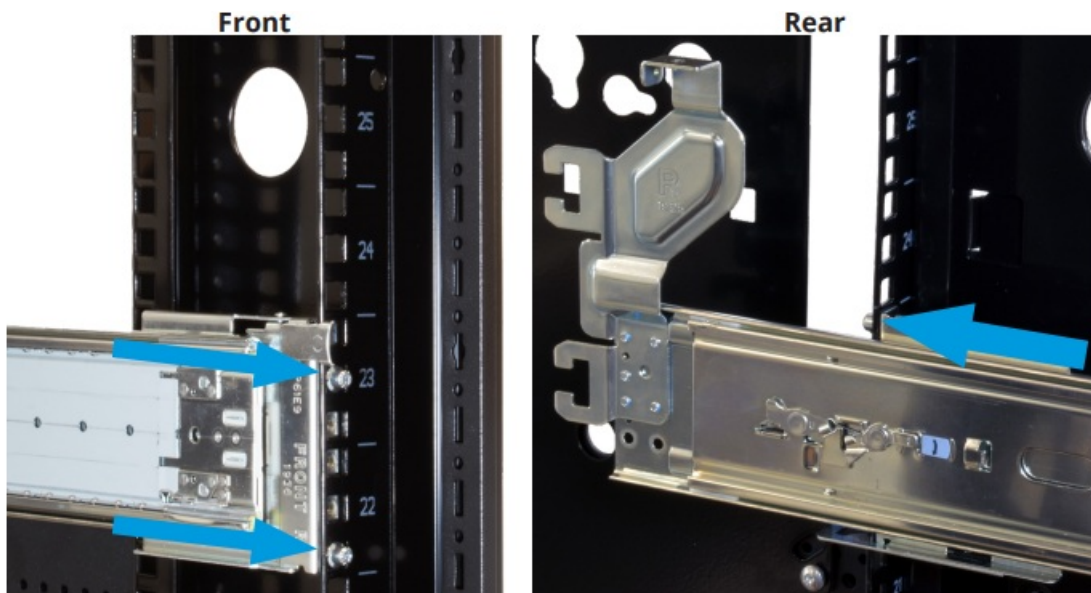
Important

- If you are installing the system in the recommended APC rack, you must unscrew both rail pins from the front of the rails.
- Align the rail pin holes with the mounting holes in the rack and push forward until the front latch clicks into place, then reinstall the rail pins.
- Make sure an additional 2U of rack space is available above the rail.
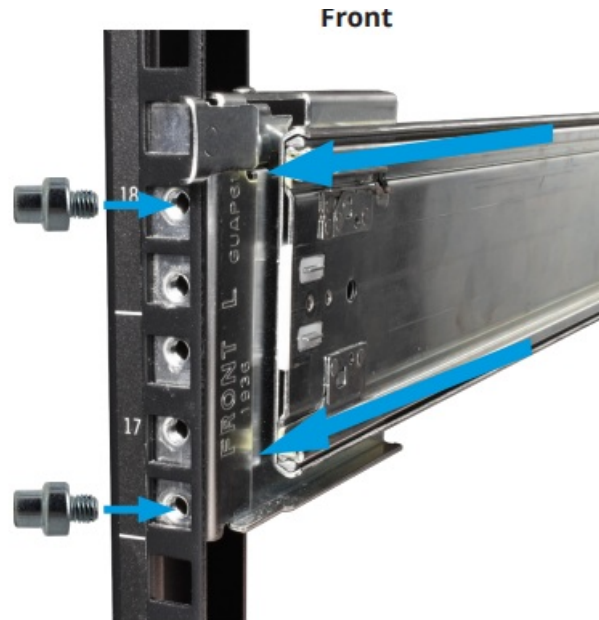
- Use three of the included washers and T15 M5 screws to secure the rear of the rail to the rack post.
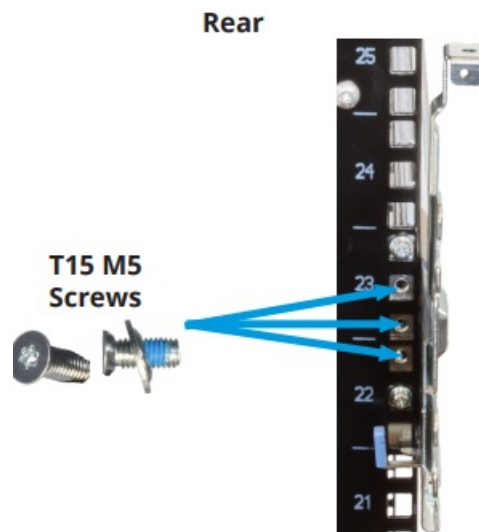
- When installed correctly, the rail front and rear are level and the inner part of the rail with the gray bearing sleeve faces inside the rack.
- Use the same procedure to install the other rail.
- Ensure both rails are at the same height on each rack post.

Install Cover Retention (Optional)

- The cover retention components hold the cover in place when the unit slides out of the rack, simplifying drive bay access.
- If you want cover retention, install alignment brackets over the rear of the rack rails.
- Then install cage nuts at the system's front for the cover retention screws.

Attach Cage Nuts

- You need two square cage nuts.
- Place a cage nut in the reserved 4U topmost rack mounting hole. A flat-head screwdriver can help push the cage nut "wings" into the rack mounting hole.
- The nut should be inside the rack, with the "wings" touching the left and right sides of the hole (horizontal). Repeat this process for the other rack post and make sure to install both cage nuts in parallel rack mounting holes.
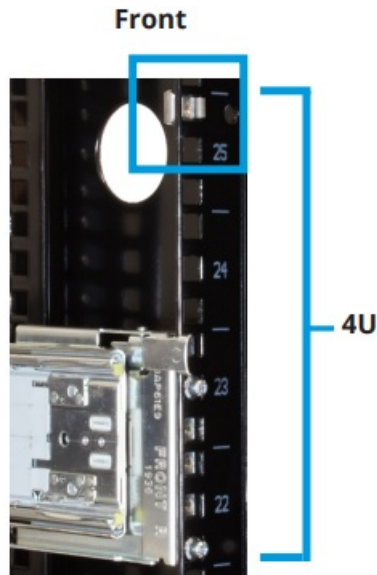
Attach Retention Brackets

- Place the Cover Retention Bracket over the rail and align it with the mounting holes on the rear of the rack rail. The groove in the bracket must point toward the inside of the rack.
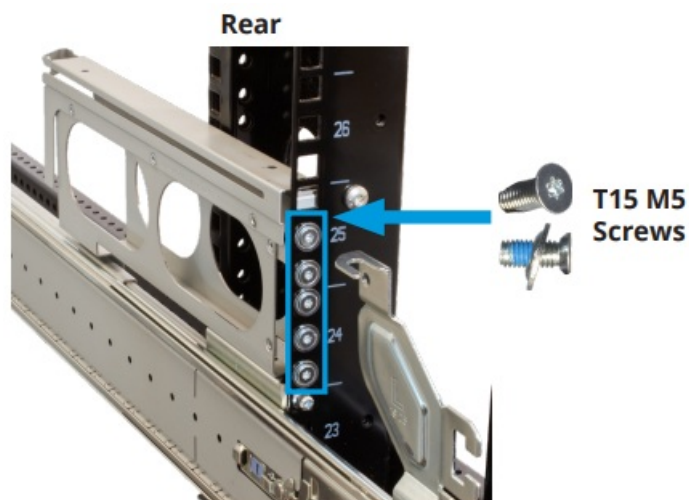- Use five washers and T15 M5 screws to secure the bracket to the rear of the rack rail.

- Use the same method to install the second alignment bracket to the other rail. Make sure the grooves on top of both brackets point inside the rack. The ES102 cover slides into the grooves when it is pushed into the rack.

Install Latch Plates

- The latch plates attach to the front of the rack rails. They secure the rails to the rack and hold the enclosure in place when fully inserted into the rack.

- Align a plate over the three holes between the rack rail front mounting pins.
- The flange must point to the outside of the rack. Use three T15 M5 screws to secure the latch plate, rack post, and rack rails together.
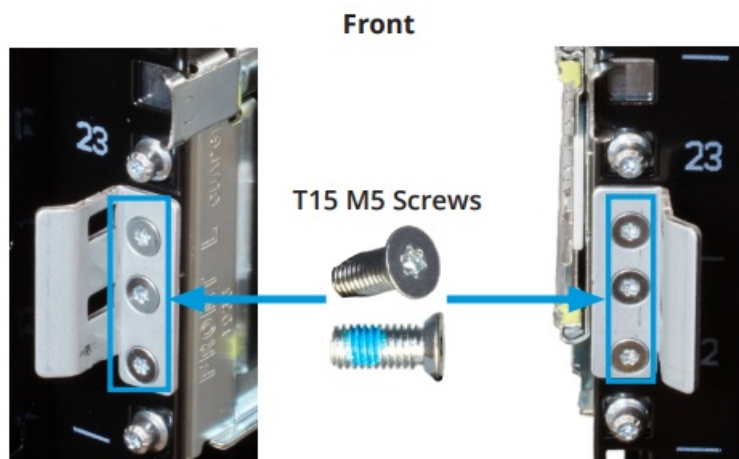
- Use the same process to install the other plate. Ensure the flanges of both latch plates face the outside of the rack.

Mount the ES102 in the Rack

- **Caution:** When using a lift, you need two people and 7ft of clearance between the system front and the rack. When lifting unaided, you need three people and 5 feet of clearance to safely lift and install the chassis.
- Do not install drives until the chassis is installed in the rack. Remove all drives before removing the chassis from the rack.
- Slide the middle part of the rack rails out of the rack until they click into place. Make sure the inner bearing sleeve is also slid as far forward as possible.

- **Warning:** Do not use the front handles to lift the ES102! The handles are only for unlatching and sliding the enclosure after attaching it to the rack rails. They cannot support the system's weight.
- Lift the ES102 and align the chassis rails with the middle rack rails. Push the ES102 into the rack rails until it stops. Locate the metal safety catches on each chassis rail and squeeze them into the chassis.
- Hold the safety catches in place and push the chassis into the rack until the chassis latches touch the rail latch plates.

- Ensure the enclosure cover slides into the Alignment Bracket grooves at the rear of the rack.
- To minimize jarring motions, gently secure the ES102 in place by swinging the front handles out and pushing the enclosure forward until it is fully in the rack.
- When you release the handles, the enclosure latches catch behind the latch plates and hold the system in the rack.
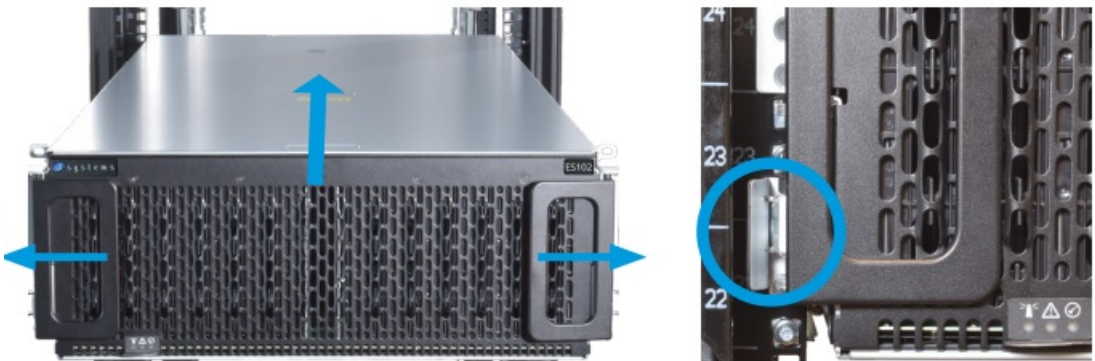
Attach Cover Retention Screws

- To hold the ES102 cover in place when the system is slid out of the rack, attach the two included Philips head reten-tion screws through the left and right cover retention holes and into the installed cage nuts.
- Make sure both screws are tight enough to securely hold the cover in place.

Cover Retention Screw
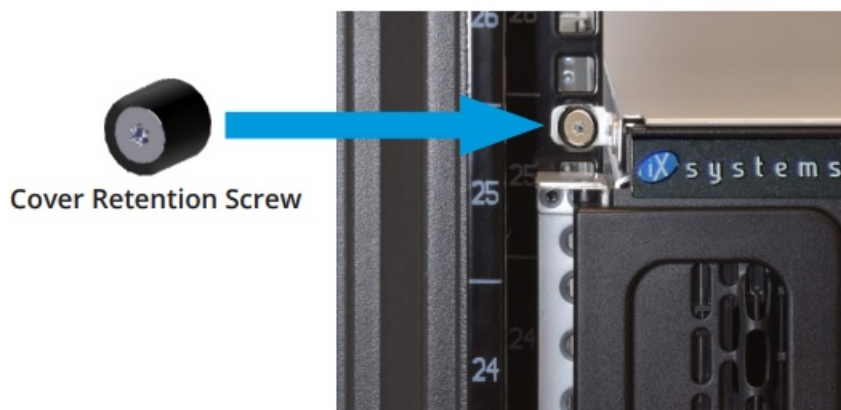
Shipping Screws

- If you are installing the ES102 in a rack for ship out, install four more M5 cage nuts in holes 3-6 of the 4U space, then install four M5 x 12mm T15 Flat Head Torx screws to secure the ES102 to the rack with the shipping bracket.

Install Cable Management Arm (CMA)

- The CMA Lite attaches to the ES102 bottom CMA brackets. The ES102 has three attach points for the lower CMA, two on the right rail and one on the left.
- Beginning with the right side, insert the outermost connection post into the outer bracket until it clicks into place. Align and insert the inner post into the innermost bracket.
- Swing the back of the CMA to the left rail and insert the post into the left bracket until it clicks into place.

- Before installing any drives in the ES102 or routing any cables through the CMA, test the installation by

unlatching the enclosure and sliding it forward until it clicks into place.

- The CMAs will fully extend behind the ES102, and the cover will remain in place, exposing the drive and component bay.
- If you feel any grinding, or the enclosure unexpectedly stops before locking into place, don't force the motion! Carefully press the enclosure rail safety catches and push it back into the rack.
- Secure it in place, and verify the Cable Management Arm, Latch Plates, Cover Alignment Brackets, and Rails are correctly installed.

Install Drives

- Do not install drives until the ES102 is in the rack. Only approved drives are compatible with the ES102.
- The ES102 ships with all the drives and blanks you need to fully populate the enclosure, packaged separately. Drives ship attached to the drive clips, but in the event you need to replace a failed drive, the procedure is below.

Attach Clip to Drive

- Align the drive and clip so the the bottom of the clip fits over the bottom of the drive and the drive connection ports are on the opposite end from the clip.
- Push the clip connection peg into place on one side of the drive, then gently flex the clip over the drive until the other peg pops into place. Repeat for all drives.

Insert Drives into the Enclosure

- Point the arrow on the clip towards the front of the ES102. Pinch the orange clips and gently push the drive down into the slot. Release the orange clips to secure the drive in place.
- Ensure the drive is fully inserted into the bay and does not extend above the system. You might need to gently work the clip into the sides of the bay to secure it.

- For proper airflow, start with the row at the back of the drive drawer. Install the drives from left to right.
- When that row is full, move to the next row forward and proceed to fill the enclosure from left to right, back to front.

Drive LED Indicators

| Behavior	Color
Activity / Normal / Hot-Spare	N/A
Fault / Issue	Blinking Amber (1 second)
Locate ID	Blinking Amber (2 seconds)
Drive Install	Solid Amber (until drive drawer closes)

Connect Power Cables

- Do not plug the power cords into a power outlet yet.
- Connect cables to the various ports on the back of the ES102 and route them through the CMA.
- Leave enough slack in the cables so that they do not disconnect when the ES102 slides out of the rack.
- **Note:** Do not connect cables to the Service or Management ports. The ES102 does not use them during operation.
- The ES102 only accepts 200-240v power input.
- Connect a power cord to the back of one power supply. Extend the plastic retention clamp, open it, fit it over the power cable, and push it down over the cable to lock it in place.
- Repeat the process for the other power cable.

Connect SAS Cables

- To set up SAS between your TrueNAS system and expansion shelves, cable the first port on the first TrueNAS controller to the first port on the first expansion shelf controller.
- High Availability (HA) systems require another cable from the first port on the second TrueNAS controller to the first port on the second expansion shelf controller.
- We do not recommend other cabling configurations. Contact iX Support if you need other cabling methods.
- If your TrueNAS system has HA, reboot or failover after connecting SAS cables to sync drives between controllers.
- **Warning:** When setting up SAS connections, please adhere to the wiring example below. Connecting expansion shelves incorrectly causes errors. Never cable a single controller to different expanders on the same shelf
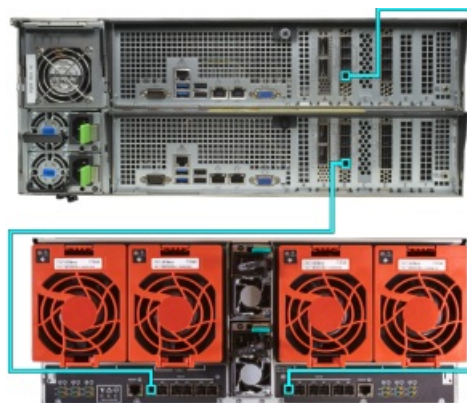
R50 R50 with a single ES102 Expansion Shelf:
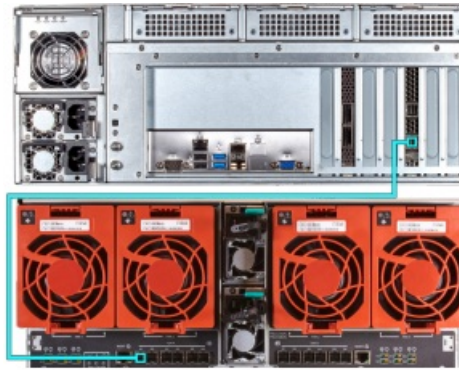
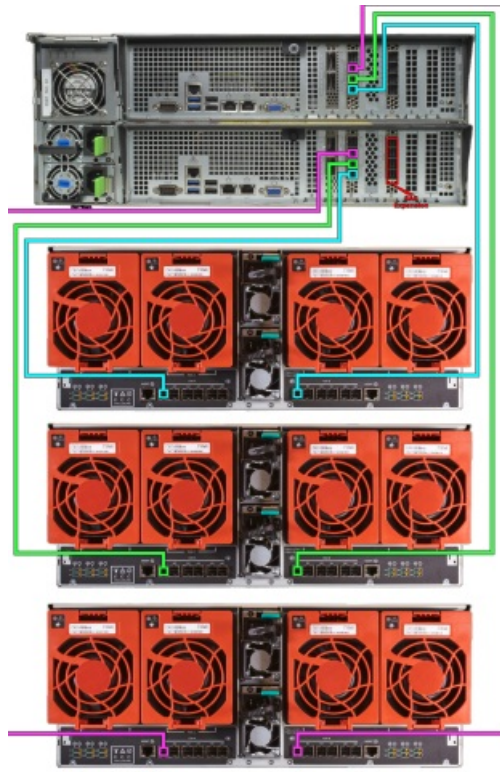

- R50 with two ES102 Expansion Shelves:

M60 (HA)

- M60 with a single ES102 Expansion Shelf

- M60 with three ES102 Expansion Shelves. The M60 supports up to 12 Expansion Shelves using additional SAS cards.

Route Cables

- Press the blue release catch on the left CMA side connector, then swing the arm to the right. To open the cable retention clips, gently squeeze and lift the top of the clip.

- Route cables through the CMA starting with the front right clip, going around the outside CMA through each clip. Leave plenty of slack in the cables when pulling them through the CMAs.

- Close all the cable retention clips, then swing the arm closed and reconnect it to the CMA bracket.
- If you see any cables getting pinched or pulled while closing the arms, do not force the motion! Return to the starting position and adjust the cables to allow more flex or avoid pinching.
- If the TrueNAS system is already on, you can turn on the ES102 any time by plugging both power cords into

PDU outlets and waiting two minutes for the drives to start.

APC AR3350 Rack Addendum

- If you are installing the ES102 in an AR3350 rack with an AR7050A curved rear door, you need at least 30" of clearance for the door to open and close.
- You must also take some extra steps to ensure the ES102 fits in the rack with the doors closed.

Adjust Rack Posts

- Uninstall one accessory channel behind each rear post by removing the three T25 bolts that hold them on the rack.

- Move the front rack posts as far to the front of the rack as possible. Move the rear rack posts as far to the back of the rack as possible. The front and rear rack posts must be as far apart as possible (31.5" measured inside to inside).

Remove Split Doors

- To remove the rear split doors, simply lift them up off the hinge pins, then pull them away from the rack. Remove both hinge assemblies on the right side of the rack after you remove the doors.

Install Curved Door

- Position the door over the hinge assemblies, then lower it onto the pins. The door will self align when correctly

installed on the hinge assemblies.
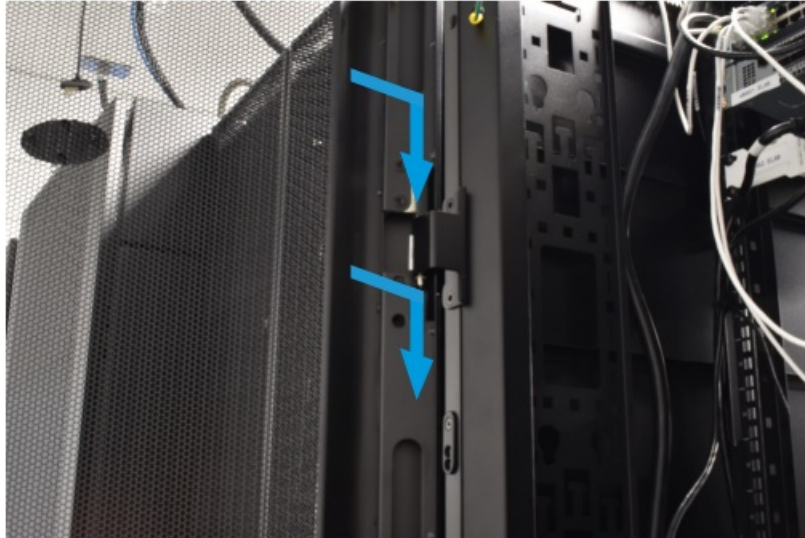
- After configuring your rack with the curved doors, return to "3 Install Railkit" on.

Additional Resources

- The TrueNAS Documentation Hub has complete software configuration and usage instructions. Click Guide in the TrueNAS web interface or go directly to: **https://www.truenas.com/docs/**
- Additional hardware guides and articles are in the Documentation Hub's Hardware section: **https://www.truenas.com/docs/hardware/**
- The TrueNAS Community forums provide opportunities to interact with other TrueNAS users and discuss their con-figurations: **https://www.truenas.com/community/**

Contact iXsystems

For assistance, please contact iX Support:

Contact Method	Contact Options
Web	**https://support.ixsystems.com**
Email	**support@iXsystems.com**
Telephone	Monday-Friday, 6:00AM to 6:00PM Pacific Standard Time: • US-only toll-free: **1-855-473-7449** option 2 • Local and international: **1-408-943-4100** option 2
Telephone	Telephone After Hours (24×7 Gold Level Support only): • US-only toll-free: **1-855-499-5131** • International: **1-408-878-3140** (International calling rates will apply)

- **Support: 855-473-7449 or 1-408-943-4100**
- **Email: support@ixsystems.com**

Documents / Resources

	TrueNAS ES102 Basic Setup [pdf] Installation Guide ES102 Basic Setup, ES102, Basic Setup, Setup

References

- ☁ **support.ixsystems.com**
- ◈ **TrueNAS Community**
- ◈ **truenas.com/docs/**
- ◈ **TrueNAS Systems |**
- **User Manual**